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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/841,079	04/25/2001	Gene D. Tener	017750-575	5957

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Patrick C. Keane
BURNS, DOANE, SWECKER & MATHIS, L.L.P.
P.O. Box 1404
Alexandria, VA 22313-1404

EXAMINER

EDWARDS, PATRICK L

ART UNIT	PAPER NUMBER
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2621

DATE MAILED: 04/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/841,079

Applicant(s)

TENER ET AL.

Examiner

Patrick L Edwards

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>2.3</u> . | 6) <input type="checkbox"/> Other: ____. |

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DETAILED ACTION

Claim Rejections - 35 USC § 112

1(a). The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1(b). Claims 9 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to claims 9 and 18, the phrase "re-sampling the first frame" lacks antecedent basis. The claims are dependent on claims 8 and 17, which recite temporally filtering the first frame. Claims 8 and 17 are dependent on claims 1 and 10, which recite resampling the second frame and the template frame.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 3, 10, 11 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Bender et al. (USPN 5,657,402).

With regard to claim 10, which is representative of claim 1, Bender discloses a sensor for generating input data and a processor module coupled to the sensor (col. 3 lines 14-17).

Bender further discloses selecting a first frame of data as a template frame and capturing a second frame of data using the EO system (col. 12 lines 13-17 in conjunction with Fig. 6). Bender discloses registering frame 201 with frame 202. In this particular situation, frames 201 and 202 from Bender are analogous to the claimed second frame and template frame, respectively. Bender further discloses capturing these frames with a video camera (col. 24 lines 46-48). This qualifies as an EO system as recited in the claim (see paragraph [0005] of the applicant's disclosure).

Bender further discloses correlating at least a portion of the second frame with the template frame to generate a shift vector (col. 11 line 66 – col. 12 line 7). Bender discloses a process for determining partial derivatives I_x , I_y and I_t . These partial derivative terms, which are used in the subsequent interpolation operation, qualify as the shift vectors recited in the claim in that they correspond to a difference between the frames (aka

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shift) and they are vectors by definition. It follows that the determination of the shift vector as disclosed in Bender is analogous to the claimed process of correlating the frames.

Bender further discloses registering the second frame with the template frame by interpolating the second frame using the shift vector (col. 11 line 19 – col. 12 line 47) and resampling at least a portion of the second frame to produce a registered frame (col. 12 line 63 – col. 13 line 6). In the first cited passage, Bender details the affine transformation (col. 11 lines 23-26) which uses the aforesaid shift vector (col. 11 line 65 – col. 12 line 1).

Interpolation is an inherent aspect of an affine transformation. So, although Bender fails to explicitly recite that an interpolation process is being performed on the frame, this is inherently disclosed in the reference. A reference has been provided (TransformJ: Affine) which further clarifies that interpolation is indeed inherent in an affine transformation. In the second cited passage, Bender discloses a resampling operation of the frame which is being warped.

Bender further discloses resampling the template frame (col. 14 lines 30 - 50). In the cited passage Bender discloses a situation where a frame 251 is being warped (registered) with a frame 252. In this case, frame 252 is analogous to the claimed template frame and after the warping is done, frame 251 is registered with the template frame. It follows that the template frame 252 is warped with the scale of frame 253. Consequently, Bender discloses resampling the template frame.

Bender further discloses combining the resampled template frame and the registered frame to generate an averaged frame (col. 17 lines 24-27 with element 414 of Figure 12). The temporal median filter disclosed in Bender generates an averaged frame of the resampled template frame and the registered frame.

With regard to claim 11, which is representative of claim 2, Bender further discloses using bilinear interpolation in the step of registering a second frame with a template frame (col. 13 lines 4-6). The bilinear interpolation disclosed in Bender occurs in the process of resampling a portion of the second frame. This process is part of the step of registering the second frame.

With regard to claim 12, which is representative of claim 3, Bender discloses adding motion to a line of sight of the EO system using a commanded line of sight pattern or a random pattern to generate multiple frames of data (col. 23 lines 1-7 and lines 55-65). The alteration of the field of view among the images in a sequence as disclosed in Bender is analogous to adding motion to a line of sight as recited in the claim. Bender does not disclose whether the field of view of the images in a sequence is altered according to a pattern or whether it is altered randomly. However, it is inherent that Bender's alteration of the field of view has to be performed either randomly or according to a pattern, seeing that no other options exist. Consequently, Bender teaches all of the limitations of the claim.

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3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6, 7, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bender as applied to claims 1 and 10 above, and further in view of Hanna et al. (USPN 6,269,175). The arguments as to the relevance of Bender as applied in paragraph 2 above are incorporated herein.

With regard to claim 15, which is representative of claim 6, Bender fails to expressly disclose resampling the averaged frame. Hanna, however, discloses a "compositing process" which is analogous to the averaged frame generating process (or combining process) recited in the claim, and further discloses resampling the averaged frame data after the compositing process (Hanna col. 12 lines 13-49). The filling of unfilled pixels disclosed in Bender qualifies as the claimed image resampling. It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Bender's image processing apparatus by resampling the previously averaged frame data as taught by Hanna. Such a modification would have allowed for a synthesized output image with a higher resolution.

With regard to claim 16, which is representative of claim 7, Hanna discloses using an upsampled frame for the purpose of filling in previously unfilled pixels (Hanna col. 12 lines 46-49). Hanna further discloses that the upsampled frame was interpolated using a bilinear interpolation method (Hanna col. 11 lines 55-57).

5. Claims 4 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bender as applied to claims 1 and 10 above, and further in view of Komiya et al. (USPN 6,205,259). The arguments as to the relevance of Bender as applied in paragraph 2 above are incorporated herein.

With regard to claim 13, which is representative of claim 4, Bender discloses determining an averaged frame, but fails to expressly disclose spatially filtering the averaged frame in order to enhance the edges. Komiya, however, discloses an image synthesizing circuit (which determines an averaged frame as recited in the claim) which is connected to the input of an edge emphasizing circuit (Komiya col. 24 lines 41-50 with Figure 41). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Bender's image processing apparatus by adding an edge enhancer for the averaged frame data as taught by Komiya. Such a modification would have allowed for an output image which contained uniformly enhanced edges.

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6. Claims 8, 9, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bender as applied to claims 1 and 10 above, and further in view of Van Ackere et al. (USPN 6,047,028). The arguments as to the relevance of Bender as applied in paragraph 2 above are incorporated herein.

With regard to claim 17, which is representative of claim 8, Bender fails to expressly disclose temporally filtering a first frame to generate the template frame. Van Ackere, however discloses temporally filtering a first frame in order to generate the template frame (Van Ackere abstract). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Bender's image processing apparatus by temporally filtering an input to generate the template frame as taught by Van Ackere. Such a modification would have allowed for a template (reference) image with less noise (Van Ackere abstract).

With regard to claim 18, which is representative of claim 9, Bender further discloses a resampling operation which utilizes bilinear interpolation (Bender col. 13 lines 1-6).

7. Claims 5 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bender as applied to claims 1 and 10 above, and further in view of Chen (USPN 6,556,704). The arguments as to the relevance of Bender as applied in paragraph 2 above are incorporated herein.

With regard to claim 14, which is representative of claim 5, Bender discloses determining an average frame, but fails to expressly disclose utilizing a histogram to change its pixel depth. Chen, however, discloses changing pixel depth on the basis of a histogram (Chen col. 4 lines 1-13). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Bender's image processing system by including a method for utilizing a histogram in order to change pixel depth. Such a modification would have allowed for an output image that had more clearly imaged background and foreground regions and consequently was more pleasant to look at (Chen col. 4 lines 1-13).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Glass (USPN 6,011,625)

Poehler et al. (USPN 6,046,695)

Nguyen et al. (USPN 6,336,082)

Van der Wal et al. (USPN 5,963,675)

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick L Edwards whose telephone number is (703) 305-6301. The examiner can normally be reached on 8:30am - 5:00pm M-F.

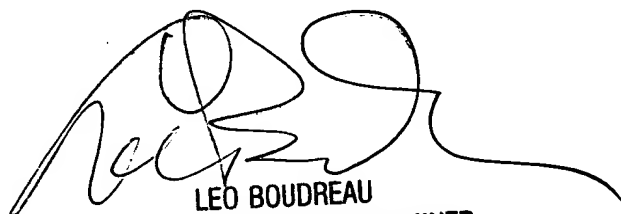
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Patrick Lynn Edwards

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ple



LEO BOUDREAU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600